Thesis/
Reports
Wischnofske
M.G.

FISH AND WILDLIFE COURSE

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MULTIMEDIA SYSTEM

STO

(3 Units)

Wischnofske

USDA - FOREST SERVICE

Pacific Northwest Region

Wenatchee National Forest

STATE OF WASHINGTON

Departments of Game and Fisheries

YAKIMA INDIAN NATION

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PRODUCED BY:

MERLE G. WISCHNOFSKE

Wildlife Biologist

1983

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COURSE OBJECTIVE

The principal objective of this course is to provide trainees a practical knowledge for treatments of fish and wildlife habitats. At least one day is required for classroom instruction (workbooks 1 and 2) and one day for practical exercise (workbook 3).

Films, slides and tapes include:

1.	Choice Stakes	10 minutes	Color	1975
2.	Habitat -- A Special Place	30 minutes	Color	Recent
3.	Life in an Old Dead Tree		Color	Recent
4.	Patterns of the Wild	26 minutes	Color	1966
5.	Managing Washington Deer and Elk		Color Slides	Recent

Prework: Read Helping Wildlife from Wildlife Management Institute and Washington State Game Bulletin - April, May, June 1963, Page 4. Copies will be sent to each trainee before this course.

Also, review the Wenatchee Forest Guide to Wildlife Habitat Relationships (blue cover), available at each Ranger Station.

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INSTRUCTIONS: Some pages of this book have questions on them. When you come to a request or question, write your answer in the blank on the same page, then check your answer on the next page. If your answer is incorrect, cross it out and write down the correct answer.

BIOLOGICAL

PRINCIPLES

Physically all animals are fundamentally mechanisms, driven by the energy liberated in the oxidation of food. As long as life continues in any organism, energy is being released.

There are no elements in living matter which are not found in its lifeless environment. The energy by which life operates is the same energy by which the simplest physical and chemical transformations are brought about.

There is a cycle, from inorganic substances in the air and soil to plant tissue, thence to animal tissue, from either of the last two stages via excretion or death and decay back to the air and soil. The energy for this flow of life is furnished by the radiant energy of the sun.

The biological principle which you read on page 5 is commonly called life's _____, which is transferred along _____.

. . . energy flow . . .

. . . food chains .

In the presence of sunlight the chloroplasts of chlorophyll-bearing (green) plants convert carbon dioxide and water into intermediate substances, and these into sugar, and sugar into starch, and liberate oxygen. This process produces practically all the food on earth.

Fish and wildlife must have certain materials for their life processes and each animal must secure the required materials that it cannot build for itself.

All life (except viruses and bacteriophage) cannot continue without the following processes: Reproduction, nutrition, growth, excretion, respiration, and irritability.

The process which produces practically all the food on earth is _____.

photosynthesis

All life responds to stimuli in the environment. From simple to complex organisms there is an increasingly elaborate coordination of receptivity of stimuli and response to stimuli. Every animal comes into this world with a certain inherited endowment of congenital behavior.

All animals can modify to some extent their inherent modes of reaction. These reactions are usually beneficial to the individual under natural conditions. The environment is constantly undergoing changes (including those which are man-made), so organisms must migrate, hibernate, aestivate, build artificial shelters, otherwise become adapted or become extinct.

Each plant or animal has a threshold for _____

to stimuli in its environment.

adaptation

or

adjustment

Reproduction is a fundamental biological process that continues life on earth by providing new individuals. The smaller the chance an organism has for survival, the more numerous its offspring. The less the amount of parental care given to its offspring, the greater is the need for the animal to be prolific.

The numbers of any species depend, on the one hand, upon its rate of reproduction and growth, and on the other, upon its death rate from accident, enemies and disease. Another significant check on an increase in numbers is competition, not only between individuals of the same species but also with other species for food and the other essentials of life.

An increase or decrease in the numbers of organisms in habitats may be rapid even though the environmental conditions apparently alter slowly and gradually.

Although a habitat may provide lush opportunities for feeding, components for _____ must be available for a species to survive.

reproduction

Many species of fish and wildlife exhibit periods of a great scarcity of individuals, alternating with periods of a great abundance. Why this regular cycle happens has yet to be explained scientifically.

The distribution and abundance of individuals of a species depends primarily on the arrangement of food, cover, water, and the space an individual normally must travel to secure these basic needs.

The quantity, quality, and arrangement of these basic needs, combined with an animal's inherent social system, determines carrying capacity for a specific unit of land. The capacity for a particular unit of habitat usually varies by the seasons of a year, including longer-term changes resulting from ecological succession. Each species of animal or plant tends to extend its distribution where these basic needs are met.

List three basic needs of an individual animal which must exist for survival in its habitat.

1. _____

2. _____

3. _____

1. Food

2. Shelter or cover

3. Water

4. Space (the amount of which is influenced by the arrangement of the other main habitat ingredients)

LOCAL

FAUNA

A number of media are available which list local fauna. A checklist of vertebrates and distribution by Ranger District is information available from our Public Affairs Specialist. This publication was developed from various sources by local biologists. The Wildlife Habitat Relationships of Eastern Washington and Birds of Wenatchee National Forest are two of the publications prepared for local use by Merle Wischnofske, Wildlife Biologist. These publications are also available through WESTFORNET, Yakima Valley Regional and Wenatchee Public Libraries, in addition to copies at unit offices of various cooperating agencies.

Of the 440 species, there are two jawless vertebrates (eels), 44 fish, 13 amphibians, 18 reptiles, 273 birds, and 90 mammals. All of these reside year around on Wenatchee National Forest, except 115 birds and 9 mammals which only spend the summer, 20 birds which only spend the winter, and another 46 birds which occasionally feed or rest during seasonal migrations.

List the number of vertebrates which occur on Wenatchee National Forest every day of each year:

_____ Birds

_____ Mammals

_____ Fishes

_____ Reptiles

_____ Amphibians

_____ Eels

92 Birds

81 Mammals

44 Fishes

18 Reptiles

13 Amphibians

2 Eels

The number of vertebrates which use coniferous forest ecoclasses are: 112 birds, 66 mammals, 11 reptiles, and 4 amphibians.

There are 78 vertebrates which use down logs and other material. Some must have this type of cover to escape bright sunlight, being nocturnal in habit. Others are true hibernators, utilizing material in advanced stages of decay for cover or insulation. Otherwise, these animals would freeze to death.

Certain animals are located on only one Ranger District. Lake Wenatchee Ranger District is known for yellow perch. Others are listed below:

Naches R.D.	Chelan R.D.	Cle Elum R.D.	Entiat R.D.
Atlantic salmon	Longnose sucker	Common carp	White sturgeon
Western red-backed salamander	Tench	Tui chub	Chiselmouth
Western ringneck snake	Slimy sculpin	Nutria	Pumpkinseed
Foothill alligator lizard	Threespine stickleback	Eastern cottontail	Walleye
Canyon wren	Peamouth chub		
Bushtit	Double-crested cormorant		
Bewick's wren			

Which Ranger Districts have the animals listed below?

Threespine stickleback _____

Walleye _____

Western red-backed salamander _____

Western ringneck snake _____

Hairy-legged vampire bat _____

Eastern cottontail _____

California ground squirrel _____

Northwestern whitetail deer _____

American moose _____

Bighorn sheep _____

Bewick's wren _____

Turkey _____

Brown creeper _____

Burrowing owl _____

Bushtit _____

Violet-crowned hummingbird _____

Gray flycatcher _____

Swainson's thrush _____

Nashville warbler _____

Merlin _____

Threespine stickleback	CHELAN
Walleye	ENTIAT
Western red-backed salamander	NACHES
Western ringneck snake	NACHES
Hairy-legged vampire bat	"RINGER"
Eastern cottontail	CLE ELUM
California ground squirrel	NACHES, CLE ELUM
Northwestern whitetail deer	CHELAN, ENTIAT, LEAVENWORTH
American moose	CLE ELUM, CHELAN
Bighorn sheep	NACHES, ENTIAT
Bewick's wren	NACHES
Turkey	NACHES, CLE ELUM, LEAVENWORTH
Brown creeper	ALL DISTRICTS
Burrowing owl	LEAVENWORTH, ENTIAT, CHELAN
Bushtit	NACHES
Violet-crowned hummingbird	"RINGER"
Gray flycatcher	NACHES, CLE ELUM
Swainson's thrush	ALL DISTRICTS
Nashville warbler	ALL DISTRICTS
Merlin	ALL DISTRICTS

LOCAL

HABITATS

A habitat or group of habitats is where a species of fish or wildlife lives. Mountain streams and lakes are home for the cutthroat trout. Beaver are found within 200 feet of water, utilizing water to secure the entrance to their lodges. Clark's nutcrackers are at home where there are copious quantities of pine seeds. Marten live best in true fir and subalpine species. Habitat is the home address of a species. White-tailed ptarmigan and water pipit make their homes in alpine meadows. Deer thrive on sage-bitterbrush, other brush and shrub habitats. Elk find abundant forage on moist meadows. Killdeer make their nest on bare ground. Bobcats use caves for reproduction.

Habitat differentiates environmental conditions, providing a logical basis for fish and wildlife assessments and treatments.

The 20 habitats of Wenatchee National Forest are described in the Guide to Wildlife Habitat Relationships by Merle Wischnofske, 1978. Our habitats are:

- Dry meadow
- Moist meadow
- Other grass
- Sage-bitterbrush
- Other brush and shrub
- Douglas-fir
- Hemlock-cedar
- Aspen
- Riparian deciduous
- Ponderosa pine
- Mixed conifer
- True fir
- Lodgepole pine
- Subalpine species
- Alpine meadow
- Water
- Bare soil
- Talus
- Cliff and rim
- Cave and burrow

Where the environment is suitable, the vegetation progresses from bare soil to trees. This process is called ecological succession. Successional stages are: Grass-forb, brush-seedling, pole-sapling, young, mature and old.

Match the following species with the letter of its typical habitat. Use each letter only once.

SPECIES	MATCH	HABITAT
Kokanee	_____	A. Dry meadow
Pacific giant salamander	_____	B. Moist meadow
Black-billed magpie	_____	C. Other grass
Western meadowlark	_____	D. Sage-bitterbrush
Ruffed grouse	_____	E. Douglas-fir
White-tailed ptarmigan	_____	F. Headwater spring
White-headed woodpecker	_____	G. Hemlock-cedar
Northern 3-toed woodpecker	_____	H. Aspen
Pika	_____	I. Ponderosa pine
Chickaree	_____	J. Subalpine species
Marten	_____	K. Lodgepole pine
Lynx	_____	L. Alpine meadow
Coyote	_____	M. Cave and burrow
Elk	_____	N. Lake
Bighorn sheep	_____	O. Talus

Kokanee	N
Pacific giant salamander	F
Black-billed magpie	D
Western meadowlark	A
Ruffed grouse	H
White-tailed ptarmigan	L
White-headed woodpecker	I
Northern 3-toed woodpecker	K
Pika	O
Chickaree	E
Marten	J
Lynx	G
Coyote	M
Elk	B
Bighorn sheep	C

Habitat is the _____ _____

of a species.

home address

LIFE

FORMS

The life form of a species characterizes its profession or the way it feeds and reproduces (principal biological functions of life).

TABLE 1. Number of fish and wildlife species by profession and indicator species using Wenatchee National Forest.

Life Forms	Reproduces	Feeds	Number of Species	Indicator* Species
1	in water	in water	48	
2	in water	on the ground, in bushes, and/or in trees	10	Cutthroat trout
3	on the ground around water	on the ground, and in bushes, trees, and water	90	Beaver
4	in cliffs, caves, rimrock, and/or talus	on the ground or in the air	34	Chukar or mountain goat
5	On the ground without specific water, cliff, rimrock, or talus association	on the ground	57	Deer or elk
6	on the ground	in bushes, trees, or the air	8	
7	in bushes	on the ground, in water, or the air	33	
8	in bushes	in trees, bushes, or the air	5	Wilson's warbler
9	primarily in deciduous trees	in trees, bushes, or the air	5	
10	primarily in conifers	in trees, bushes, or the air	13	
11	in conifers or deciduous trees	in trees, in bushes, on the ground, or in the air	24	Chickaree
12	on very thick branches	on the ground or in water	7	
13	in own hole excavated in tree	in trees, in bushes, on the ground, or in the air	13	Pileated woodpecker or
14	in a hole made by another species or in a natural hole	on the ground, in water, or the air	42	Northern 3-toed woodpecker
15	in a burrow underground	on the ground or under it	41	Deer or elk
16	in a burrow underground	in the air or in the water	10	Beaver
		TOTAL:	440	

* Two additional species are listed in Table 1 of Workbook 2. They were selected to represent specific animals, not a whole life form.

What does life form mean?

A group of fish and/or wildlife species characterized by similar biological modes of feeding and reproduction.

Life form is the profession of a species.

How can you use life forms to treat habitats for fish and wildlife production?

Strategies can be formulated through the use of indicator species to facilitate the principal biological functions of feeding and reproduction.

Life forms have been synthesized into indicator species, like a taxonomist would synthesize species into genera.

AGENCY

ROLES

There are numerous organizations involved with the treatment of fish and wildlife. A list of organizations, agencies, and officials concerned with natural resource use and management is updated annually in the Conservation Directory, available from the National Wildlife Federation, 1412 16th Street N.W., Washington, DC 20036, at a price of $9.00 (plus $1.55 for shipping). This directory lists more than 900 agencies and organizations concerned with natural resources use. A brief statement of the purpose for each one is included.

Not only are organizations included in the Conservation Directory, but also periodicals of interest, sources of audio-visual materials, etc.

USDA Forest Service

Administers 2,163,150 acres of Wenatchee National Forest and is responsible for the treatment of its resources. Cooperates with Federal and State officials in the enforcement of game laws on this Forest and in the development and maintenance of wildlife resources; cooperates with the State and private owners in the application of sound forest management practices, in the protection of forest lands against fire, and in the distribution of planting stock. Conducts research in the entire field of forestry and wild land management.

Treatment of habitat defines the responsibility for fish and wildlife. A "stable flow" annual-increment of habitat must be provided, according to 16 U.S.C. 528-531.

USDA Soil Conservation Service

Provides resource data and technical assistance in soil and water conservation through local conservation districts to land users in rural and urbanizing areas. Helps finance small watershed projects to help communities with flood protection, water management and supply, recreation, and improving wildlife habitat. Has USDA leadership for multi-County resource conservation and development projects. Publishes soil surveys.

USDI Fish and Wildlife Service

Aids in conservation of migratory birds, certain mammals, and sport fishes. Applies research findings in the development and management of a system of National wildlife refuges for migratory birds and endangered species; operation of a system of fish hatcheries; management of populations of migratory game birds through regulation of time, degree, and manner of taking; acquisition and application of technical knowledge necessary for perpetuation and enhancement of fish and wildlife resources; biological monitoring of development projects; enforcement of several laws including the Endangered Species Act, the Lacey Act, the Migratory Bird Treaty Act. The Service administers Federal aid to State governments; provides technical assistance to State governments; serves as lead Federal agency in international conventions on wildlife conservation; and operates a program of public affairs and environmental education to inform the public of the status of America's fish and wildlife resources.

Yakima Indian Nation

Involved in the treatment of fish and wildlife on lands administered by Wenatchee National Forest, by rights within the Treaty of June 9, 1855.

Audubon Society

The primary goals are to educate members and the public in areas of environmental concern and wildlife appreciation; take actions in matters of local, State, and National environmental concern. Activities include: Regular field trips, Christmas bird count, regular membership meetings, and educational entertaining programs.

Yakima Valley Chapter (225 members)
P.O. Box 9701
Yakima, WA 98909

North Central Washington Chapter (185 members)
100-2 Simon Street S.E.
East Wenatchee, WA 98801

Wildlife Management Institute

National, nonprofit, private, membership organization, supported by industries, groups, and individuals, promoting better use of natural resources for the welfare of the Nation.

Publishes conservation literature, including Helping Wildlife: Working with Nature by Delwin E. Benson, 1977. This booklet will prepare trainees for this multimedia fish and wildlife course.

The bi-weekly Outdoor News Bulletin should be required reading for those persons involved with the treatment of fish and wildlife habitats.

Washington Department of Fisheries

Make available to the people of Washington the maximum economic, recreational, aesthetic use and benefit of the food fish and shellfish resources of the State, while preserving the basic reproductive stock.

Ensure a continuing supply and the best utilization of salmon, marine fish and shellfish to sportsmen, and to those whose primary occupation is commercial fishing, fish processing, and fish production distribution.

Washington Department of Game

Provide optimum wildlife oriented recreation through utilization and enhancement of the big game, upland game, migratory upland game, small game mammals, waterfowl, and furbearers.

Preserve, protect, perpetuate, and enhance non-game wildlife and habitat resources of the State for the benefit of the citizens of Washington State.

Provide the fishing public with optimum, multi-faceted recreational fishing opportunities on Federal, State, and other public lands.

Optimize the fish production potential of suitable waters by stocking diverse species of cold water fish fry at appropriate rates where populations are not self-sustaining, or where self-sustaining populations are inadequate to provide a fishery.

Provide protection for wild and introduced fish populations through regulation and habitat protection.

On lands administered by Wenatchee National Forest, the primary role of the Forest Service for fish and wildlife is _____ _____ and the primary role of the Washington Department's of Game and Fisheries is _____ _____.

habitat treatment

animal husbandry.

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Fish and Wildlife management is the art and science of (1) manipulating habitat to produce a population of animals or habitat management and (2) manipulating animal populations for a specific reason or population management. The two production goals are (1) maintain viable populations of resident species, commonly called treatment for species richness and (2) enhance conditions for a species in a specific habitat for a purpose, commonly called treatment for indicator species. Neither treatment mutually excludes the other.

What are the two production goals of Fish and Wildlife Management?

1. _____

_____.

2. _____

_____.

1. Treatment for species richness.

2. Treatment for indicator species.

Prescribing treatments for species richness follows an assessment of edges and their locations. Induced edges, such as roads, must be examined for their longer term effects, not only on site but also for considerable distances off site.

Interspersion of plant communities (habitats) and successional stages plays a major role in wildlife distribution and abundance, treated in chapter 5 of the classical book titled Game Management, by Aldo Leopold (1933) and other publications on ecology.

Four of the most obvious natural factors that work separately and in combination to produce inherent edges are: (1) abrupt changes in soil type, (2) topographic differences, (3) geomorphic differences and (4) changes in microclimate. These edges are long-term features of a landscape.

An edge where successional stages or vegetative conditions within a plant community meet is induced. Induced edges are constantly changing due to natural and/or man-related activities. These edges are short-term features of a landscape.

The amount of edge and habitat size determine the number of species in a locality. The value of an induced edge may be either positive or negative, depending on its location and effects.

List one example of an induced edge and one example of an inherent edge found on Wenatchee National Forest.

Induced edge_____

_____

_____.

Inherent edge_____

_____

_____.

Induced edges

A clearcut in mature Douglas fir forest.

A camp site by a lake.

A fire lookout tower.

A road near a stream.

A grass seeding within true fir habitat.

A moist meadow with domestic livestock.

Inherent edges

A talus slope within ponderosa pine habitat.

A meadow bordering an aspen community.

A line where basalt meets granite.

A ridge line.

A timber line.

A shore line.

Prescribing treatments for indicator species follows an assessment of habitats present and the acreage available for each one. Prediction of effects on indicator species from Forest activities can be made from this assessment.

Table 1.

Relationship Between Indicator Species and TRI-Ecoclass Subsystem

Indicator species	Ecoclasses	To show essential needs of:
Chinook Salmon	WR	Anadromous Fish
Cutthroat Trout	AB, AC, AX, NA, NI, NF, NL, NM, WL, WR	Life Forms 1 and 2
Beaver	HC, NF, WL, WR	Life Forms 3 and 16
Deer	CA, MM, NAC9, NAS9, SD, SS	Life forms 5, 6 and 15
Elk	AG, AR, CA, GA, GB, GM, GS, GX, MD, MM, MS, MT, MW, NAC9, NAS9, SD, SS	Life forms 5, 6 and 15
Pileated woodpecker	CD, CF, CH, CW	Life forms 13 and 14
Spotted owl	CD, CF, CH, CW	Spotted owl
Northern 3-toed woodpecker	CL, CE, CM, CS, CX, CA	Life forms 13 and 14
Chickaree	CD, CF, CH, CL, CP, CW, CX, CE, CM, CS	Life forms 10, 11 & 12
Wilson's warbler	AO, AP, HQ, NFC9, SM, SW, SX	Life forms 7, 8, and 9
Chukar	NR, NT	Life form 4
Mountain goat	NR, NT	Life form 4

What must first be accomplished before treatments can be prescribed for indicator species?

An assessment must be made to determine which habitats are present and the acreage available for each one.

Indicator species management or habitat treatment is a strategy for wildlife and fish husbandry which produces relatively high numbers of selected species in particular places for particular purposes.

The branch representing wildlife on the multiple-use tree is just as large as one representing another resource. That wildlife habitat requirements and values are as important as other resource values on a given unit of Forest land is policy in FSM 2603, May 1979, amendment 35, including 2606.13 for timber management coordination.

Management of Forest land to maintain minimum habitat requirements is not the strategy for indicator species, but a legal requirement.

Indicator species management or _____ treatment is

a _____ for fish and wildlife husbandry which produces relatively

_____ numbers of selected species in particular _____

for particular _____.

. . . HABITAT . . .

. . . STRATEGY . . .

. . . HIGH . . .

. . . PLACES . . .

. . . PURPOSES .

FOREST

DIRECTION

Our Forest activities are controlled by laws, regulations, executive orders, policy, resource treatment standards, guide to wildlife habitat relationships, and best management practices. A review and commentary of certain policies, directives and guides which we use can be found in our general technical report INT-76. Forest Service manuals available for office review list current direction for management of Forest lands. Handbooks, such as FSH 2609.11 for wildlife habitat improvement, give guidelines and designs for certain treatments. Biological specialists from various agencies are available for consultation. A compilation of best management practices intended for use in the design of all projects on Wenatchee National Forest was issued September 18, 1980.

List five sources which should be consulted in designing fish and wildlife requirements for a silvicultural treatment on Wenatchee National Forest.

P. L. 94-588 NFMA

P. L. 93-205 T&E

P. L. 93-452 SIKES

16 USC 528-531 MU

FSM 1020

Executive Order 11989

USDA Secretary's Memorandum 9500-3 of 7/20/82: Enhance Habitat

36 CFR 219

FSM 2060

FSM 2476.5 Amendment No. 6

FSM 2603 Amendment No. 38 and R-6 Supplement No. 16

FSM 2630.3 R-6 Supplement No. 18

FSM 2633.7 Amendment No. 38

FSM 2670.3 Amendment No. 36

FSH 2609.11

FSM 2631 Wenatchee Supplement No. 2

WNF Guide to Wildlife Habitat Relationships

1015 References . . . March 1, 1978 Wenatchee National Forest

Biological Specialists and Technicians

WNF Best Management Practices September 18, 1980

FSM 1251.03 January 1976 Amendment No. 26: Prompt Use of New Knowledge

Wildlife Relationships of Eastern Washington

USDA Handbook 553

Holling, C. S. 1978 Adaptive Environmental Assessment and Management. John Wiley and Sons. New York, NY, 377 pages

Thomas, Jack Ward; Toweill, Dale E. 1982. Elk of North America. Stackpole Books, 698 pages.

TREATMENTS FOR SPECIES RICHNESS

One of our best management practices is to prevent an increase in peak stream flow to a point that exceeds a channel's capacity. If not prevented, a productive, meandering stream may become a sterile ditch with excessive bedload at its mouth.

Scouring of a stream channel becomes critical for aquatic life when peak flows exceed 10 percent of normal, which can be caused by conflagrations or accelerated tree removals over a short period of time.

Monitoring, decisive action and rehabilitation are necessary for the protection of fish and wildlife resource values to meet existing direction.

What can be done to prevent scouring of a stream channel?

1. Monitoring of streamflow.

2. Monitoring of bedload deposition.

3. Monitoring of tree removals.

4. Decisive action.

5. Post-mortem and rehabilitation.

An assessment of edges and their location has been completed for a proposed timber sale. The sale area is on a gentle slope in an expanse of mature Douglas-fir trees. The understory vegetation will develop rapidly into a cover of trailing wild blackberry and vine maple upon clearcutting. It will be necessary to burn the slash on the sale units to prepare for hand planting of tree seedlings.

A shallow pond of 1-2 acres occurs on the western side of the sale area, fed by a small stream inhabited by native cutthroat trout.

Ruffed grouse have been seen in a small opening of willows and clover at one end of the shallow pond. Deer occur in low numbers.

The elevation is about 2,800 feet.

What are three treatments that you would propose for species richness?

1.

2.

3.

1. Disperse cutting units, so that no point within the unit is more than 600 feet from cover and no point within the cover is more than 600 feet from an opening. (Cover is that vegetation which will hide 90 percent of a deer at 200 feet or less.)

2. Develop minimum stands of six acres of aspen or 18 acres of willow or suitable combinations on valley grades less than 15 percent, where the valley is wider than the stream channel. At least one of these stands would be developed as an additional edge between the pond and the Douglas-fir Forest.

3. Develop some herbaceous vegetation on logging-disturbed sites, including one pound of inoculated white dutch clover per acre.

4. Maintain the integrity of riparian habitat.

An assessment of edges and their locations has been completed for a proposed ORV trail. The trail will provide public access to a scenic waterfall, mountain meadows and a ridgetop which terminates as a vertical cliff of several hundred feet. The view from the cliff is a mosaic of Forest patterns including a lake about a mile away. Quite often, a few mountain goats can be observed either on the ledges of the cliff or on the dry openings adjacent to it. Bird watchers also frequent the area to observe black swifts, gray-crowned rosy finches and golden eagles. Elk use the area during the summer months.

The elevation along the ridgetop is about 5,500 feet.

Name three edges and your wildlife concern for each one in this ORV trail proposal.

1. _____

_____

_____

2. _____

_____

_____

3. _____

_____

_____

1. WATERFALL

Possible conflict between bird watching and ORV use.

2. RIDGETOP

Possible wildlife harassment from noise projection.

3. MEADOWS

Location of ORV trail may have adverse edge effects where meadows border other habitats.

4. CLIFF

Safety zone for ORV use; mountain goat harassment from noise projection.

5. FOREST TYPES

No suspected effects on wildlife; most of the ORV noise will be absorbed by the trees.

TREATMENTS FOR INDICATOR SPECIES

Homelight Timber Sale has been proposed for an area with a cover of 56 percent mature and older trees, 27 percent pole, young stands and 17 percent grass, seedling successional stages. All coniferous habitats show surpluses of mature and older trees beyond that needed for the reproduction and feeding requirements of pileated woodpecker and chickaree.

The existing habitats and acres are:
dry meadow (22), moist meadow (242), other grass (45), sage-bitterbrush (16), other brush and shrub (60), Douglas-fir (884), ponderosa pine (461), mixed conifer (4,279), true fir (4,930), subalpine species (115), bare soil (57), talus (316) and cliff & rim (59).

Indicator species of wildlife are:
pileated woodpecker, northern 3-toed woodpecker, Wilson's warbler, chickaree, elk and deer.

Five miles of new road will be necessary for access.

List two provisions for the treatment of pileated woodpecker habitat and two provisions for the treatment of elk habitat on Homelight Timber Sale. You may wish to refer to Table 1, page 17 and the instruction on page 21 in formulating specific answers.

Pileated woodpecker _____

_____

_____

_____

_____

_____

_____

_____

Elk _____

_____

_____

_____

_____

_____

_____

_____

Pileated woodpecker:

1. Maintain 300 acres of either CD, CDC9, CP, CPC9, CF, CW, CWC9, or combinations of these in mature and older successional stages for reproduction of pileated woodpecker.

2. Maintain 173 snags and cull trees per square mile, with a DBH of 20 inches or larger and a height of 25 feet or more.

3. Maintain two uncharred class 1 and 2 logs per acre. Keep class 3, 4 and 5 logs which have little or no commercial value, but are acceptable for fuel loading and nutrient recycling.

Elk:

1. Maintain the grass and shrub ecoclasses, listed for elk in Table 1, as forage producing areas. Best Management Practice 1.16 is a guideline for silvicultural-related activities.

2. Maintain a 30-acre stand of thermal cover adjacent to essential elk forage and/or as cover for reproduction and lactation within 600 feet of potable water.

3. Revegetate and fertilize logging-disturbed sites.

4. Rehabilitate roads which are not essential for administration or public access.

The Hi Lo Timber Sale has been proposed for an area with a cover of 28 percent mature and older trees, 12 percent pole, young stands and 60 percent grass, brush, seedling successional stages. Tree cover has been severely depleted, especially on Douglas-fir habitat.

The existing habitats and acres are:
other grass (59), sage-bitterbrush (629), other brush and shrub (718), Douglas-fir (5,854), ponderosa pine (1,028), mixed conifer (62), true fir (12), lodgepole pine (552), subalpine species (3,961), alpine meadow (449), and cliff & rim (1,612).

Indicator species are:
cutthroat trout, pileated woodpecker, northern 3-toed woodpecker, chukar, Wilson's warbler, chickaree and deer.

Three miles of new road will be required to access five MMBF for clearcut and final removal harvesting.

List two provisions for the treatment of chickaree habitat and two provisions for the treatment of deer habitat on Hi Lo Timber Sale.

Chickaree _____

_____

_____

_____

_____

Deer _____

_____

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_____

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Chickaree:

1. Maintain an average of 48 cone-producing trees per acre on 70 percent or more of the coniferous Forest habitat.

2. Maintain two uncharred class 1 or 2 logs per acre. Keep class 3, 4 and 5 logs which have little or no commercial value, but are acceptable for fuel loading and nutrient recycling.

3. Maintain a hardwood tree component, such as maple or oak, for food production.

Deer:

1. Maintain forage producing areas, according to Best Management Practice 1.16.

2. Maintain a 2-acre stand of thermal cover adjacent to or within essential deer forage and/or as cover for reproduction and lactation within 600 feet of potable water.

3. Rehabilitate roads which are not essential for administration or public access.

4. Revegetate logging-disturbed sites, including inoculated white dutch clover in the seed mix.

The Cow Pie allotment includes primary grazing of meadows, grasslands, shrublands and transitory grazing of timber harvest units. Approximately 15,000 acres are included for livestock use, half of which is transitory range. The existing habitats and acres are: moist meadow (900), other grass (1,600), sage-bitterbrush (2,100), other brush and shrub (1,160), riparian-deciduous (340), aspen (1,000), alpine meadow (400), mixed conifer (500), true fir (3,000) and subalpine species (4,000).

Indicator species are: cutthroat trout, beaver, deer, elk, chickaree, pileated woodpecker, northern 3-toed woodpecker, Wilson's warbler and chukar.

Riding and salting practices are used to maintain fairly good livestock distribution on this allotment. The grazing season is May 15 to October 1.

List two provisions for the treatment of chukar habitat and two provisions for the treatment of deer habitat on Cow Pie allotment.

Chukar _____

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_____

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Deer _____

_____

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_____

Chukar:

1. Defer grazing a portion of the grasslands adjacent to cliff & rim and talus habitats until July 1 to maintain nesting cover.

2. Maintain cover around water sources.

3. Maintain the integrity of roosting sites.

Deer:

1. Terminate livestock grazing of bitterbrush at full bloom stage to allow the accumulation of new growth.

2. Apply up to 100 pounds of urea to each acre of moist meadow during the first few weeks of the growing season.

3. Maintain 50 percent of the aspen and coniferous habitats as forage producing areas, 25 percent in pole-young successional stages and 25 percent in mature and older trees.

4. Prevent conflagrations and indiscriminate motorized use, including Best Management Practice 1.16.

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(Page 17 is for notes.)

TABLE 1. Relationship of TRI Ecoclass Map Codes to Habitats on Wenatchee National Forest, 1980

HABITATS	CODES BEGINNING WITH	EXCEPTIONS
Dry Meadow	MD	
Moist Meadow	MM, MT, MW	
Other Grass	AG, AR, GA, GB, GM, GX	
Sage-bit-terbrush	SD	
Other Brush & Shrub	AO, AP, NFC9, SM, SW, SX	
Douglas-fir	CD	CDC9
Hemlock -cedar	CH	
Aspen	HQ	
Riparian Deciduous	HC	
Ponderosa Pine	CP	CDC9
Mixed Conifer	CDC9, CPC9, CWC2, CWC9	
True Fir	CF, CW, CX	CWC2, CWC9
Lodgepole Pine	CL	
Subalpine Species	CA, CE, CM, CS, NAC9, NAS9, SS	
Alpine Meadow	GS, MS	
Water	NI, WR, WL	
Bare Soil	AB, AC, AX, NA, NF, NL, NM, NS, NX	NAC9, NAS9, NFC9
Talus	NT	
Cliff & Rim	NR	
Cave & Burrow	(NO MAP CODE)	

No. 1

Bumpy Timber Sale has been proposed for an area with a cover of 63 percent mature and older trees, 15 percent pole, young stands and 22 percent grass, brush, seedling successional stages. Coniferous habitats, except Ponderosa pine and subalpine species, show surpluses of mature and older trees beyond that needed for minimum wildlife diversity.

The existing habitats and acres are: moist meadow (73), other grass(31), other brush and shrub (110), Douglas-fir (653), hemlock-cedar (5,211), ponderosa pine (22), mixed conifer (332), true fir (5,999), lodgepole pine (641), subalpine species (1,330), alpine meadow (13), bare soil (627), talus (496), cliff & rim (113), and lake (1,257).

The Bumping River below Bumping Dam is an anadromous stream. An estimated 11 MMBF of timber is proposed for removal by tractor and skyline. Approximately 1.7 new miles of road will be required.

A baseline inventory of vegetation and wildlife by the Washington Department of Game and a map of the Bumpy Sale will also be made available for this exercise.

Examine the Bumpy Timber Sale proposal as a team and identify the following:

1. T&E species using the sale area
2. R-6 sensitive species
3. Fish and wildlife indicator species
4. Principal edges
5. Issues, concerns and opportunities for fish and wildlife
6. Recommended habitat treatments
7. Placement of timber harvest units
8. Plan for dead wood retention
9. Monitoring requirements
10. Plan for utilization of fish and wildlife specialists and/or technicians

No. 2

North Amabilis Timber Sale has been proposed for an area with a cover of 37 percent mature and older trees, 4 percent pole, young stands and 59 percent grass, brush, seedling successional stages. These data are based on 1979 information and do not include any areas where timber has been cut or planned for cutting since then. Cutting on adjacent intermingled private lands has also not been considered. Mature and older trees are below minimum levels needed by wildlife. Portions of the sale area are winter range for mountain goat. A wolverine was observed about eight years ago near the sale by Neil Payne and Dick Taber from the University of Washington.

The existing habitats and acres are: moist meadow (93), other grass (3), other brush and shrub (53), Douglas-fir (196), hemlock-cedar (280), aspen (14), mixed conifer (92), true fir (6,083), subalpine species (172), bare soil (105), talus (94), cliff & rim (272), and lake (3,128).

An estimated 6 MMBF of timber is proposed for clearcutting and final removal by tractor and skyline. Approximately one mile of new road will be required. A map of North Amabilis Sale will be made available for the exercise.

Examine North Amabilis Timber Sale proposal as a team and identify the following:

1. R-6 sensitive species
2. Fish and wildlife indicator species
3. Principal edges
4. Mountain goat winter range
5. Issues, concerns and opportunities for fish and wildlife
6. Recommended habitat treatments
7. Placement of timber harvest units
8. Plan for dead wood retention
9. Monitoring requirements
10. Plan for utilization of fish and wildlife specialists and/or technicians

T E A M

S O L U T I O N S

Discuss team solutions

at a suitable location,

to be arranged.

EXAMINATION

Conduct a written

examination, prepared

separately from

this workbook.

Conduct a review

of the examination,

including questions

about this Fish and

Wildlife Course.

CRITIQUE

OF

COURSE

Complete your critique

on the form provided

and leave it with the instructor(s).

NOTES:

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